

GAO

Testimony

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CAPITOL VISITOR CENTER

Update on Status of Project's Schedule and Cost As of June 28, 2006

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Physical Infrastructure Issues



Mr. Chairman and Members of the Subcommittee:

We are pleased to be here today to assist the Subcommittee in monitoring progress on the Capitol Visitor Center (CVC) project. Our remarks will focus on the Architect of the Capitol's (AOC) progress in achieving selected project milestones and in managing the project schedule since the Subcommittee's May 24, 2006, hearing on the project.¹ As part of this discussion, we will address a number of key challenges and risks that continue to face the project, as well as actions AOC has taken or plans to take to address these risks. In addition, we will discuss the status of the project's costs and funding.

Our remarks today are based on our review of schedules and financial reports for the CVC project and related records maintained by AOC and its construction management contractor, Gilbane Building Company; our observations on the progress of work at the CVC construction site; and our discussions with the CVC team (AOC and its major CVC contractors), AOC's Chief Fire Marshal, and representatives from the U.S. Capitol Police. We also reviewed AOC's construction management contractor's periodic schedule assessments and daily reports on the progress of interior wall and floor stonework.

In summary:

Since the Subcommittee's May 24 CVC hearing, AOC has extended the project's scheduled completion and opening dates. The CVC team has continued to move the project's construction forward, but primarily because of significant problems associated with the CVC's fire protection system, gift shops, and utility tunnel, AOC has extended the scheduled completion dates for the base CVC project and the House and Senate expansion spaces by approximately 2-1/2 months, from February 23, 2007, to May 7, 2007, for the CVC, and from May 25, 2007, to August 8, 2007, for the expansion spaces. Furthermore, to allow time for possible additional delays and preparation for operations, AOC is now proposing to open the CVC in July 2007 with a temporary certificate of occupancy and the expansion spaces in August 2007, at which point a final certificate of occupancy will be issued for the CVC. Previously, AOC was planning to open the CVC in April 2007 and the expansion spaces in May 2007. We are

¹GAO, *Capitol Visitor Center: Update on Status of Project's Schedule and Cost as of May 24, 2006*, [GAO-06-803T](#) (Washington, D.C.: May 24, 2006).

reassessing the project schedule, as we stated at the Subcommittee's last CVC hearing, and expect to finish our reassessment by mid-September. Pending our reassessment, AOC's new July and August 2007 time frames appear to be reasonable tentative targets for opening the CVC and House and Senate expansion spaces. However, we are not as confident as we would like to be about whether the CVC team will be able to meet the challenges, risks, and uncertainties that continue to face the project, given the difficulties the team has historically had in meeting its targets and milestones. Thus, we expect to have greater confidence in the target opening dates after we complete our schedule reassessment.

- During the past month, work on the project has progressed in a number of areas. For example, the CVC team has finished restoring and has opened the portion of East Capitol Street that runs above the CVC's utility tunnel and has finished installing the veneer plaster portion of the ceiling in the great hall and piping for the sprinkler system throughout the CVC. In addition, critical interior wall and floor stone installation has continued, together with other interior and exterior construction work, and the sequence 2 contractor has continued work on its area-by-area plans to prevent trade stacking² during finish work. About 96 percent of the interior wall stone for the CVC itself (excluding the atrium areas, the East Front, and the tunnels) is now installed.
- Delays associated with the CVC's fire protection system, gift shops, and utility tunnel primarily led the CVC team to add about 50 workdays to the project schedule. During the last 5 weeks; the sequence 2 contractor also fell short of its installation target for interior wall stone; the pace of floor stone installation remained far below the targeted pace; and several other base project and expansion space activities—including East Front work—fell further behind schedule. Indicators of construction progress that we have been tracking for the Subcommittee also support AOC's extensions of the proposed completion and opening dates. For example, the sequence 2 contractor met only 2 of the 14 milestones we have been tracking for this hearing, and this contractor's monthly billings indicate that construction work is more likely to be completed closer to AOC's new target dates than its previous ones.

²Trade stacking can occur when workers from different trades, such as stone masons, electricians, plumbers, or plasterers, have to work in the same area at the same time to meet a schedule, sometimes making it difficult to ensure sufficient space and resources for concurrent work.

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- AOC's new schedule provides additional time to complete work, and we believe, on the basis of the information available to us at this time, that AOC's July and August 2007 proposed opening dates tentatively appear reasonable; however, we have not yet finished reassessing AOC's schedule to better determine whether this additional time will be sufficient in view of the challenges, risks, and uncertainties that the project continues to face. For example, the CVC fire protection system has not yet been fully approved; critical building systems still have to be commissioned and tested; and certain design or work scope elements are still incomplete or are being clarified, refined, or changed, even though the project's overall design is essentially complete. In addition, the delays in completing the utility tunnel have created an additional risk: if the sequence 2 contractor has difficulty achieving and maintaining required temperature and humidity levels, the project's ceiling and finish work could be further delayed. More information should be available on this and other schedule-related issues by the time we finish reassessing the project schedule in mid-September, following the completion of AOC's reassessment, which is expected by July 31.

Before the schedule changed this month, we were estimating that the total cost to complete the entire CVC project would be about \$556 million without an allowance for risks and uncertainties and \$584 million with such an allowance—an amount that we continue to believe should be sufficient. To date, about \$530 million has been provided for CVC construction. The \$26 million in remaining funds needed is consistent with our last estimate of the amount of additional funds AOC would need to complete the entire CVC project. In addition, as we have previously indicated, AOC preliminarily expects to need about \$950,000 in fiscal year 2007 AOC general administration appropriations to pay for the contractual support needed to complete acceptance testing of the facility's fire protection system in time to meet the project schedule. AOC plans to determine if it can reduce the amount needed for this contractual support; we will keep the Subcommittee apprised of this situation. Furthermore, AOC is likely to incur additional costs because of the problems associated with the CVC's fire protection system, gift shops, utility tunnel, and other issues. In light of these problems, we do not know whether the \$556 million estimate, which does not include an allowance for risks and uncertainties, will cover the costs to complete the project, but we currently believe that our \$584 million estimate, which does include such an allowance, should be sufficient. We plan to reassess our cost-to-complete estimate this summer and provide our results to the Subcommittee by mid-September.

AOC Has Extended the Project's Proposed Completion and Opening Dates

AOC has extended the CVC project's proposed completion and opening dates because, although the CVC team has continued to make progress in a number of areas since the Subcommittee's last CVC hearing, significant delays have also occurred, especially in work on the CVC's fire protection system, gift shops, and utility tunnel. Indicators of progress that we have been monitoring for the Subcommittee support AOC's extension of the proposed dates, and remaining challenges, risks, and uncertainties could further affect the project's progress. AOC's proposed time frames tentatively appear reasonable, but further reassessment of the project schedule is needed to gain greater confidence in the revised dates.

AOC Has Postponed the Proposed Completion and Opening Dates about 2-1/2 Months

According to the May 2006 project schedule, the base CVC project will be completed in May 2007 and the House and Senate expansion spaces will be completed in August 2007, about 2-1/2 months later than indicated in the April 2006 schedule. Moreover, according to the May schedule, the base project will be opened in July 2007 and the expansion spaces will be opened in August 2007—time frames that AOC believes will accommodate possible additional delays and allow start-up time for operations.

According to the May 2006 schedule, most of the physical construction work in the CVC, the East Front, and the expansion spaces will be completed by December 31, 2006; however, some work in the exhibit gallery, the gift shops, and the East Front extends into 2007—as far as March 2007 for the gift shops and certain East Front work. Neither the CVC nor the expansion spaces can be opened until the Chief Fire Marshal has completed acceptance testing for the fire protection and life safety systems, now scheduled for May 2007 for the CVC and August 2007 for the expansion spaces. The Chief Fire Marshal plans to issue a temporary certificate of occupancy for the CVC's base building when he completes his testing of it and a final certificate after he completes his testing of the expansion spaces and limited retesting of the CVC's base building. AOC believes that it may be able to shorten some of the time scheduled for testing the fire protection system and that it may be able to open segments of the expansion spaces earlier than August 2007. As we have discussed in previous CVC testimonies, AOC is continuing to explore this possibility.

Although the CVC team has had difficulty meeting milestones and continues to face challenges, risks, and uncertainties, the July 2007 opening time frame for the CVC would give the team 2 to 3 months (depending on the specific date in July) after the May 7, 2007, scheduled completion date to address additional delays and prepare for operations. Some time could also be available in August to address issues associated

with the acceptance testing of the expansion spaces, which is scheduled to begin on May 8, 2007, after the initial acceptance testing of the CVC is completed. Thus, AOC's July and August 2007 time frames for opening the CVC and expansion spaces tentatively appear reasonable at this time pending our reassessment of the project schedule, to be done over the next several weeks.

Construction Work Is Progressing

According to information provided by AOC and its construction management contractor and our observations, work on the project has advanced, in terms of both the dollar value of the work in place and individual project elements. In dollar terms, AOC's construction management contractor reported that, as of May 31, the overall CVC project was about 82 percent complete and the sequence 2 work was about 71 percent complete—up from about 81 percent and 70 percent, respectively, as of April 30. Progress on individual project elements includes the following:

- *Surface work above the CVC utility tunnel* was largely completed, leading to the opening of East Capitol Street in June, and work on the House connector tunnel has continued.
- *Interior CVC work* has made additional progress, according to AOC's construction management and sequence 2 contractors. For example, the sequence 2 contractor has finished installing veneer plaster ceilings in the great hall; structural steel framing for the glass floor in the exhibit gallery; piping for the heating, air conditioning, and ventilation system throughout the CVC and expansion spaces; and piping for the sprinkler system throughout the CVC. Furthermore, the CVC team, the U.S. Capitol Police, and AOC's Fire Marshal Division have also resolved issues associated with the CVC's security and fire protection systems that, if not resolved, could have impeded construction progress.
- *Wall stone installation* has progressed substantially in the East Front plaza level, atriums, and auditorium and continued in other areas, such as the food service area. As of last week, the sequence 2 contractor had installed about 96 percent of the interior wall stone in the CVC itself, excluding the atrium areas, the East Front, and the tunnels.
- *On the East Front exterior*, AOC and its construction management contractor reported, new waterproofing was installed under the center steps, a skylight structure was erected and glass was installed in the openings north and south of the great hall, and materials and equipment

were delivered for the penthouse mechanical work.

- *In the House and Senate expansion spaces*, progress was made in installing drywall, roughing in electrical systems, and performing work in other trade areas.

Further Delays Have Occurred as Risks Have Materialized

Since the Subcommittee's May 24 hearing, problems have occurred in a number of areas that we expressed concerns about during the Subcommittee's last three CVC hearings. These include problems associated with the base project's fire protection system and the House and Senate gift shops, which have had the largest impact on the schedule—resulting in AOC's extension of the date for the CVC to obtain a temporary certificate of occupancy from February 23, 2007, as shown in the April schedule, to May 7, 2007, as shown in the May schedule. Problems have also delayed work on the CVC utility tunnel and the expansion spaces.

To resolve issues associated with the base project's fire alarm system and gift shops, the CVC team added a net of 51 workdays to the project's May schedule, reflecting (1) additional time for resolving issues raised by AOC's Fire Marshal Division about shop drawings for the base CVC building's fire alarm system, (2) additional time for programming the fire alarm system, and (3) a change in the schedule logic involving the time for starting the programming. AOC's Fire Marshal Division completed its review on June 1 and approved most elements of the base building's fire alarm system, but raised a number of problems and concerns. For example, it found that the firefighter telephone system and manual pull stations proposed by the subcontractor did not meet contract specifications. In addition, the CVC team learned that the sequence 2 fire alarm system subcontractor did not plan to start programming the fire alarm system until all relevant issues, including those raised by the Fire Marshal Division about the CVC's fire alarm shop drawings and proposed fire alarm system equipment, were resolved. Because the programming had previously been scheduled concurrently with other activities, the team added time to the schedule for the programming. Work on the gift shops has been delayed because the estimated costs and bid price for their fit-out greatly exceeded the budget for this work. AOC planned to request approval from the House and Senate Committees on Appropriations to reprogram funds from CVC operations to construction to cover the shortfall and plans to move forward with the gift shops in segments by executing contract modifications based on the available funding until its reprogramming request is approved. However, AOC said that this

reprogramming request did not include any contingency funding for the gift shops and therefore it anticipates having to request another reprogramming of funds for such contingency funding. The CVC team and the Fire Marshal Division established and have implemented an expedited process for resolving the identified problems and concerns, and according to the team and AOC's Chief Fire Marshal, the issues raised by the Fire Marshal Division about the CVC's fire alarm shop drawings and proposed fire alarm system equipment are being worked through for resolution and resubmission to the Fire Marshal Division. However, it is not yet clear how much time will be needed to address other fire protection system issues; the Fire Marshal Division has not yet completed its reviews of shop drawings for other components of the system because the design of the CVC's base building fire alarm system had to be approved first; and the gift shop design and funding issues have not been fully resolved. We plan to include these areas in our reassessment this summer.

Delays associated with the CVC utility tunnel led the CVC team to extend the date for it to become operational from June 29, 2006, as shown in the April 2006 schedule, to August 4, 2006, as shown in the May 2006 schedule. These delays occurred because preliminary work on an old tunnel took longer than expected. The old tunnel, which contains piping from the Capitol Power Plant that is connected to piping in the CVC utility tunnel, was inaccessible before temporary shoring work was completed. According to AOC, this temporary shoring work was completed on June 16, and last week the CVC team began asbestos cleanup in the old tunnel, in the area where piping from the new tunnel is connected to piping in the old tunnel. After this cleanup is done, the CVC team is to continue work in the old tunnel necessary to enable steam and chilled water to flow from the Capitol Power Plant to the CVC. Given the history of problems associated with the utility tunnel, it is not clear at this time whether it will be operational on schedule, and additional delays could further adversely affect the project, as we will discuss later in our testimony. Several other base project activities—which we will discuss shortly—have also been delayed, but these delays have had a smaller impact.

Delays in commissioning the air handling units and in installing ceiling tile in the expansion spaces during the past month will affect the project schedule, and some work has been resequenced, but the resequencing will not affect the schedule, according to the sequence 2 contractor. The air handling units are necessary for testing the fire protection system in both the CVC and the expansion spaces, and the ceiling tile must be installed in the expansion spaces for that testing. According to the fit-out subcontractor, the ceiling tile work was delayed because the

subcontractor doing the work had to wait for direction on audio-visual rough-in work. The sequence 2 contractor resequenced the installation of circular staircases in the House and Senate atrium areas because extensive concrete chipping in one atrium, which was required to correct out-of-tolerance sequence 1 work, and scaffolding set up in the atriums to install wall stone precluded the sequence 2 fit-out subcontractor from gaining access to work areas in both atriums.

In addition to the construction-related adjustments to the schedule for the expansion spaces, the 51-workday delay in the CVC schedule produced a corresponding 51-workday delay in the schedule for the expansion spaces, extending their opening from May 25, 2007, as shown in the April schedule, to August 8, 2007, as shown in the May schedule. This extension will occur because, as we have discussed in our previous CVC testimonies, AOC plans to have most of the acceptance testing of the CVC's fire protection system completed before the acceptance testing of the expansion spaces begins.³ AOC believes that this sequential approach to the acceptance testing will allow the CVC to open with a temporary certificate of occupancy somewhat earlier than if the acceptance testing were performed concurrently. AOC is still considering opening the expansion spaces in sections, which means that some sections could possibly open earlier than August 8, 2007.

**Indicators of Construction
Progress Support
Extension of Project
Schedule**

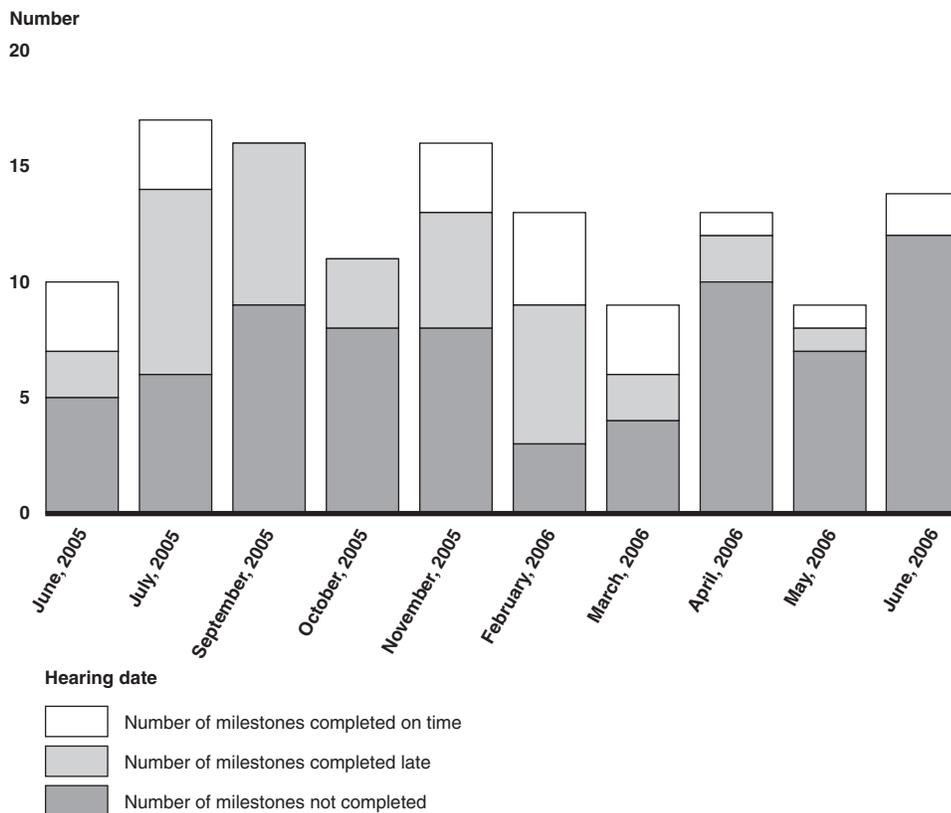
Besides the delays that have already occurred, several indicators of construction progress that we have been tracking for the Subcommittee suggest that the revised completion and opening dates in AOC's May 2006 schedule are more realistic than the previously scheduled dates. An update on these indicators follows:

Sequence 2 contractor continues to miss milestones. Starting with the Subcommittee's June 2005 CVC hearing, at the Subcommittee's request, we and AOC have been selecting and tracking sequence 2 milestones to help the Subcommittee monitor construction progress. These milestones include activities that were either on the project's critical path or that we and AOC believe are critical to the project's timely completion. As figure 1 shows, the sequence 2 contractor has generally missed these milestones.

³AOC is planning to have the smoke control system in the CVC and expansion spaces tested at about the same time because certain parts of the smoke control system in the expansion spaces must operate before the CVC can open.

For today's hearing, 14 of these milestones were due to be completed, according to the project's January 2006 schedule. One was completed ahead of schedule, one was completed on schedule; and none of the remaining 12 had been completed as of June 26. (See app. I.) AOC's sequence 2 contractor attributed the slippages to a number of factors, including the need to do remedial or preparatory work in the East Front and auditorium and the need to resolve outstanding issues and resequence work for a number of reasons, such as to prevent damage or to move materials stored in an area that was otherwise ready for the next stage of work.

Figure 1: Sequence 2 Contractor's Progress in Meeting Selected Milestones as of CVC Hearing Dates



Source: Sequence 2 contractor, AOC and its construction management contractor, and GAO.

In total, AOC's construction management contractor reported delays in 17 of 23 critical and near-critical paths that AOC's construction management contractor identified as important to meeting the base project's overall

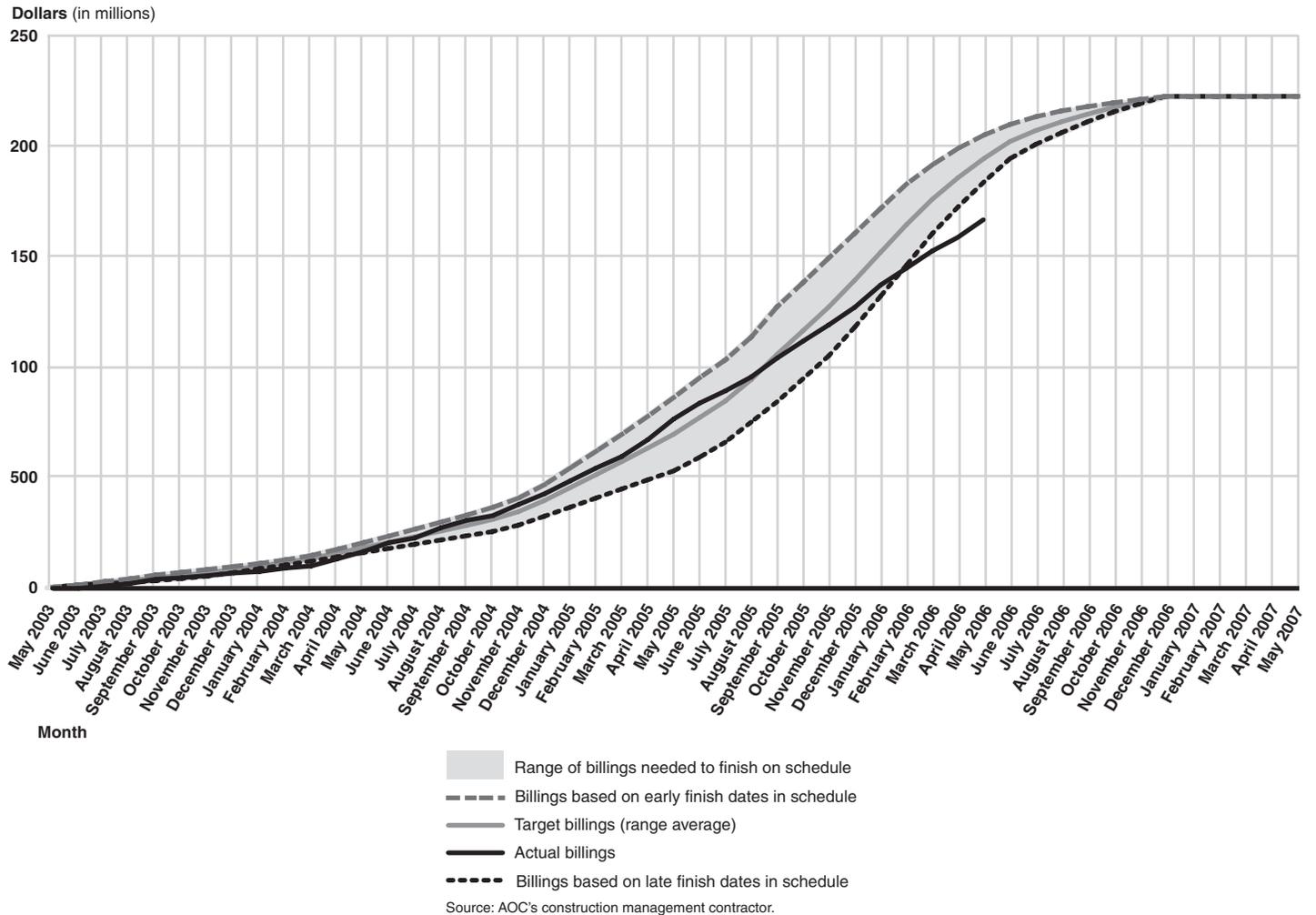
completion date.⁴ According to AOC's construction management contractor, delays besides those in the fire protection system, gift shops, and utility tunnel have occurred in other activity paths since the Subcommittee's last CVC hearing. These other delays occurred in, but were not limited to, the East Front, the orientation theaters, the exhibit gallery, certain elevator installations, the upper level assembly room, and the House connector and Library of Congress tunnels. According to the CVC team, these other delays were attributable to design changes, water leaks, deficient sequence 1 work, changes in the sequence of work activities by the sequence 2 contractor, and inaccessible work areas. Even more important than the individual delays themselves, however, is their likely impact on the CVC team's ability to complete construction work on schedule. So many activities have fallen behind schedule that relatively short additional delays could push the CVC's overall completion date further back. The number of critical and near-critical paths increased from 21 in the project's April schedule to 23 in the May schedule.

Value of completed work is consistent with revised schedule. Another indicator of construction progress that we and AOC's construction management contractor have been tracking is the value of the completed construction work billed to the government each month. Both we and the construction management contractor believe that the sequence 2 contractor's monthly billings, including the bills for March, April, and May 2006, indicate that AOC is more likely to finish closer to its currently scheduled completion dates than its previously scheduled completion dates. While this indicator has some limitations (for example, billings lag behind construction), it is generally regarded in the construction industry as a useful measure of how likely a project is to be completed on time. Figure 2 compares the sequence 2 contractor's billings since May 2003 with the billings needed to complete construction work on schedule and

⁴Construction projects typically have one critical path, which is the sequence of activities having the longest duration through the schedule. There is no slack time associated with these activities, meaning that a delay in a critical path activity will delay the entire project unless a way is found to reduce the time required for other activities along the critical path. Some projects have multiple critical paths simultaneously; in practice, the CVC had what essentially amounted to two concurrent critical paths in May—(1) acceptance testing of the fire protection system and (2) fit-out of the gift shops. (AOC's construction management contractor reported the fit-out of the gift shops as a near-critical activity because of a change in schedule logic it had made, but because this delay would otherwise have had the same impact on the project's completion as the acceptance testing delay, we regard it as a second critical path.) Generally, the more critical and near-critical activities a project has, the greater is the risk of late completion because there are more opportunities for slight delays that can adversely affect the project's completion.

indicates that the sequence 2 contractor is unlikely to finish the project until the late spring or summer of 2007 unless the value of completed work increases significantly. We believe that a significant increase will be difficult, given the limited number of areas that will be ready for finish work at any given time.

Figure 2: Total Billings by the Sequence 2 Contractor for the Entire CVC Project Compared with the Billings Needed to Finish Construction Work on Schedule



Notes:

The early and late lines on this figure reflect the cumulative billings that would be required to complete the project through contract modification number 102 (\$224.8 million total contact value) by the early and late finish dates shown in the sequence 2 contractor's schedule based on the September 2006 contractual completion date.

The actual line reflects the sequence 2 contractor's actual monthly billings.

Although bills are typically submitted for payment after work is completed, it is often likely that construction work will be completed on schedule when the actual billing line falls between the early and late lines in the figure. With respect to the CVC, the actual billing line has been trending below, and in March 2006 went below, the late finish line, where it remained in April and May 2006. Even with the lag in billings, this trend indicates that the amount of work being completed each month is not sufficient to finish the project on the project's previous schedule.

Interior stone installation is taking longer than expected. Overall, about 80 percent of the CVC's interior wall stone has been installed (includes the CVC, East Front, atrium areas, and tunnels), according to AOC's construction management contractor, and the sequence 2 contractor installed 4,795 pieces of interior wall stone during the last 5 weeks, about 30 percent short of its 6,959-piece production target. During the same period, the sequence 2 contractor installed about 2,825 square feet of floor stone, or about 20 percent of the 15,070 square feet specified in a preliminary floor stone installation plan that the contractor provided to AOC shortly after the February 15 CVC hearing. In addition, 4 of the 14 schedule milestones that we and AOC have been tracking for the Subcommittee for today's hearing are related to interior wall stone installation, and the sequence 2 contractor met 1 of these 4 milestones.

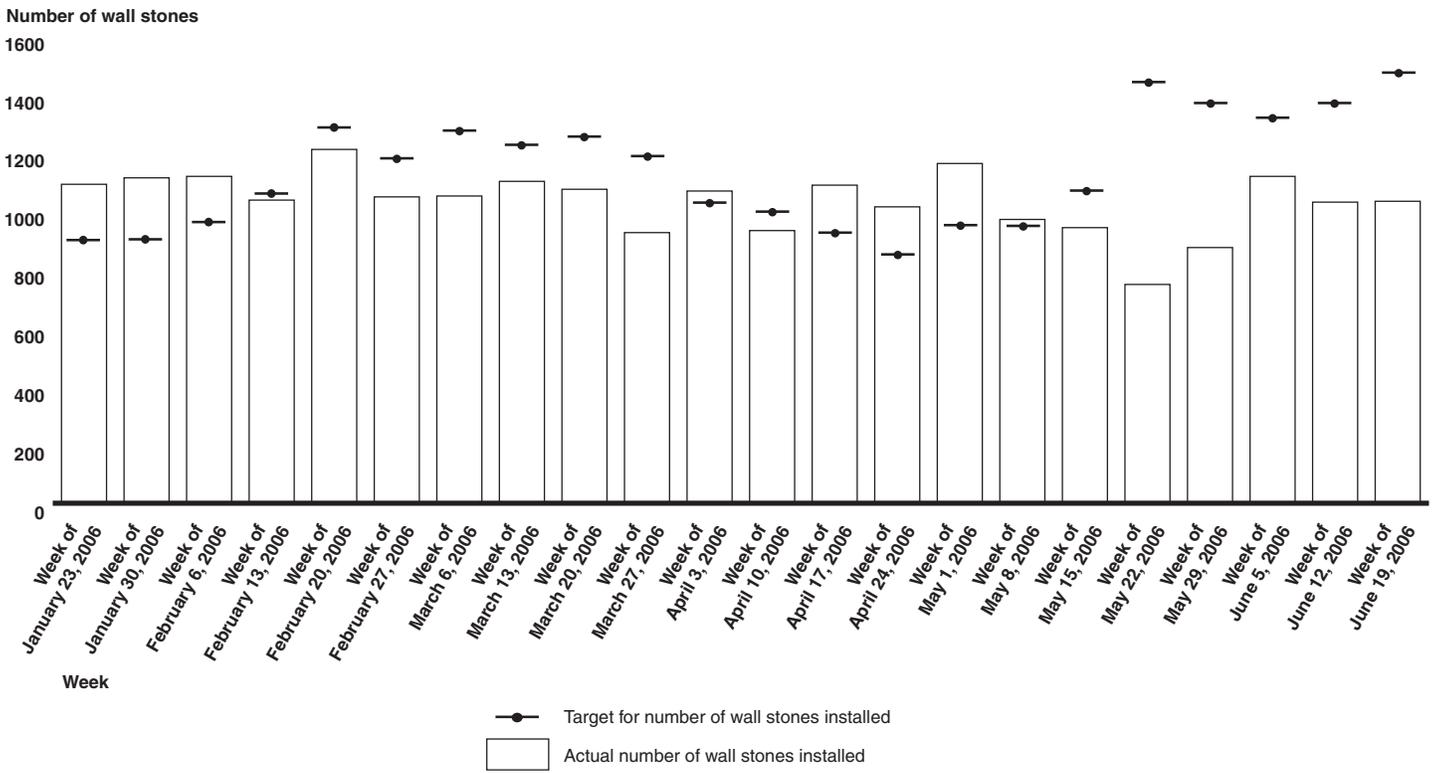
According to the CVC team, the sequence 2 contractor has missed its stone installation targets for a variety of reasons, including the need to correct problematic sequence 1 work or properly prepare certain spaces for the installation of wall or floor stone, a change in wall stone design, late deliveries of floor stone for the exhibit gallery, and delays in some spaces in finishing certain work, such as ceiling work, that usually precedes floor stone installation. The sequence 2 contractor did not meet the milestones for wall stone installation that we are tracking for the Subcommittee because certain remedial work was necessary and several of its masons were doing noncritical wall stone installation in other areas. The masons were doing this noncritical work while remedial or preparatory work was being performed in the East Front and atrium areas so that wall stone installation could start or continue in those areas, according to AOC's construction management contractor. In addition, AOC's construction management contractor reported that wall stone for remaining work in the upper level of the orientation lobby, which had been awaiting delivery because of a change in the type of stone to be used, has been delivered.

The sequence 2 contractor has not yet finished installing floor stone in the exhibit gallery, largely because it ran out of floor stone for that area during certain periods in April and May. According to the sequence 2 contractor, the supplier of floor stone for the exhibit gallery is a small company that was not able to fabricate the floor stone as quickly as needed. AOC's construction management contractor said that the sequence 2 contractor has now received all of the exhibit gallery floor stone. The sequence 2 contractor does not expect previous installation delays to adversely affect the overall completion of the exhibit gallery.

To finish installing floor stone in other areas of the CVC, the sequence 2 contractor said that it (1) plans to move many of the masons installing wall stone to floor stone installation soon and (2) has drafted a new set of targets for floor stone installation, which the CVC team has been reviewing. We plan to review the contractor's revised targets when they are provided to us and will track the contractor's performance against its revised targets for the Subcommittee's subsequent CVC hearings. Finally, according to AOC's construction management contractor, over 60 percent of the CVC's interior floor stone has been fabricated, and the sequence 2 contractor does not anticipate future problems with floor stone supply.

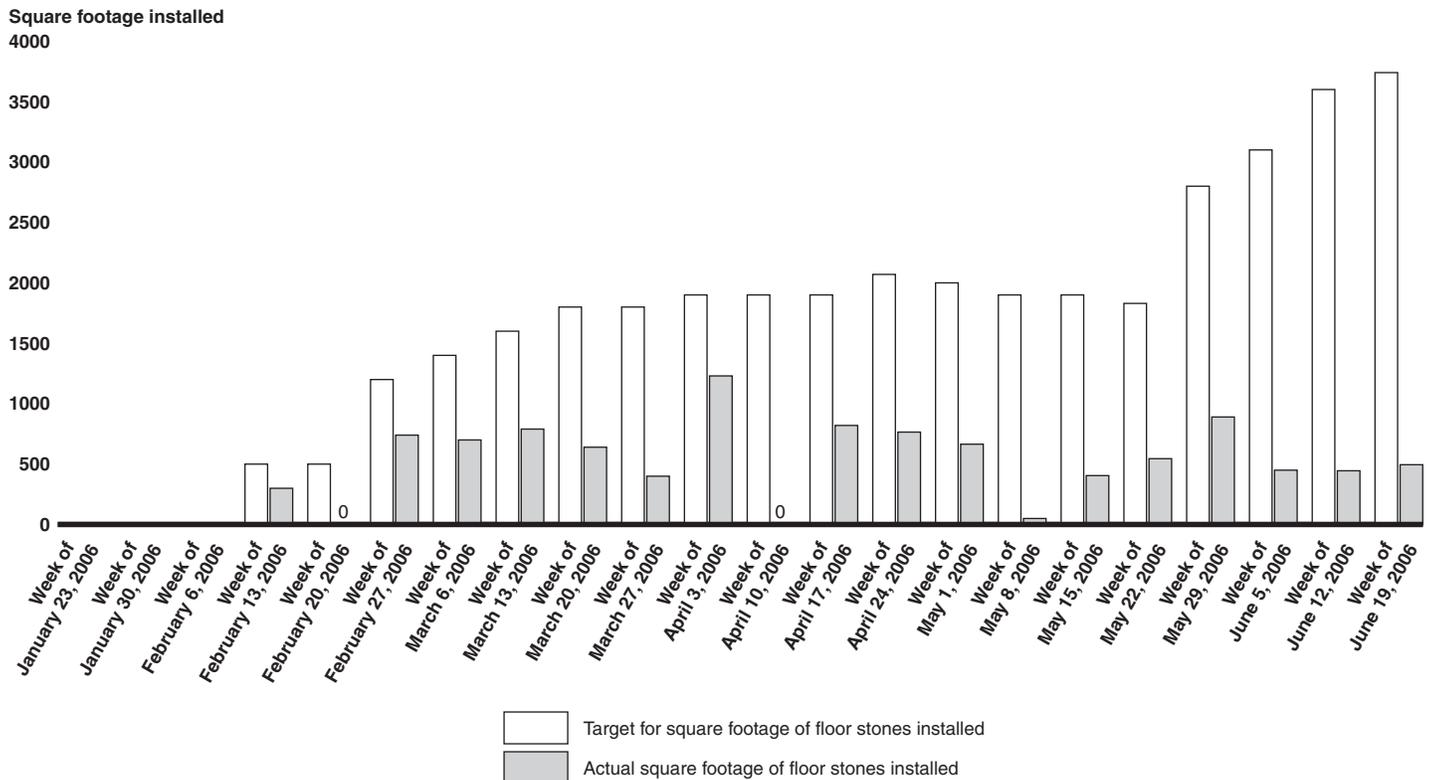
Figures 3 and 4 show the sequence 2 contractor's progress in installing interior wall and floor stone since January 23 and February 13, 2006, respectively.

Figure 3: Progress of CVC Interior Wall Stone Installation Compared with Targets Set by the Sequence 2 Contractor



Source: AOC's construction management contractor.

Figure 4: Progress of CVC Interior Floor Stone Installation Compared with Preliminary Targets Set by the Sequence 2 Contractor



Source: AOC's construction management contractor.

Project Schedule Remains Vulnerable to Challenges, Risks, and Uncertainties

As we have indicated during the Subcommittee's previous CVC hearings, we believe that the CVC team continues to face challenges, risks, and uncertainties in completing the project. At this time, the 2 to 3 months that AOC has added to the proposed opening dates for the CVC and the expansion spaces seem sufficient to address these challenges, risks, and uncertainties. Nevertheless, given the project's history of delays—including those that have occurred since the Subcommittee's last hearing—together with information previously provided to us by CVC team managers and members about the lack of sufficient time in the schedule for certain activities, we are not as confident as we would like to be about whether the CVC team will be able to address all of the challenges, risks, and uncertainties and finish all construction activities by the currently scheduled dates. Accordingly, we plan to reassess the project

schedule this summer and report our results to the Subcommittee by mid-September 2006. A brief update follows on the challenges, risks, and uncertainties the CVC team continues to face and the team's plans for addressing them:

- *Trade stacking could delay completion.* As we discussed during the Subcommittee's previous CVC hearings, trade stacking could hold up finish work, such as drywall or ceiling installation, electrical and plumbing work, plastering, or floor stone installation. This work could be stacked because of delays in wall stone installation. Trade stacking could also increase the risk of accidents and injuries. Hence, it remains important, as we said at previous CVC hearings, for the CVC team to closely monitor construction to identify potential trade stacking and promptly take steps to address it. The CVC team has also identified trade stacking as a high risk, and in its May progress report, AOC's construction management contractor expressed concern about having enough workers to do ceiling work because much of the wall stone work is to be finished at the same time, making several areas available for ceiling work at the same time. The sequence 2 contractor has developed plans that show when various subcontractors will be working in each area of the CVC except the East Front, which the sequence 2 contractor does not expect to be ready for finish work for several weeks. According to the sequence 2 contractor, it intends to continue meeting regularly with its subcontractors to review and update the area plans and to have the area plan for the East Front done before finish work begins there. In mid-June, the sequence 2 contractor reported that its area-by-area plans had prevented trade stacking to date. Although we and AOC agree that these area-by-area plans are important and should be helpful in reducing the risk of trade stacking, we are still concerned about the potential for future trade stacking because of the delays that have already occurred and future delays that could occur.
- *Complex building systems remain a significant risk.* The CVC will house complex building systems, including systems for heating, ventilation, and air conditioning; fire protection; and security. These systems not only have to perform well individually, but their operation also has to be integrated. If the CVC team encounters any significant problems with their functioning, either separately or together, during commissioning or acceptance testing, the project could be seriously delayed. During the Subcommittee's March 15 CVC hearing, we noted that the sequence 2 contractor planned to submit the shop drawings for the CVC's fire protection system for review by March 17. However, the contractor did not submit the drawings for the base project until the end of April, in part because more time was needed to incorporate changes, AOC's

construction management contractor said. The shop drawings for the CVC's base building fire alarm system were given to AOC's Chief Fire Marshal on May 1, and he and his staff completed their review on June 1. As we previously mentioned, AOC's Fire Marshal Division approved most of the system and is now resolving the open issues with the CVC team. Some additional construction work may be required to address some of the Fire Marshal Division's comments, but AOC does not expect this work to further delay the project's completion. The Fire Marshal Division finished reviewing the shop drawings for the expansion space fire alarm system by June 26. The Fire Marshal Division has not been able to finish reviewing the shop drawings it has received for components of the fire protection system outside the base project because the CVC's base building fire alarm system had to be reviewed first. In addition, the Division did not yet have complete information on when it would receive additional shop drawings. Delays could arise if it takes longer than expected for the team to get approved shop drawings or if the proposed system does not meet the project's design specifications or the fire protection code's requirements.⁵ In addition, the Chief Fire Marshal noted that delays could occur if the CVC team does not adequately pretest the system and correct any problems found during the pretesting. On March 23, AOC's commissioning contractor submitted its plan for testing the performance of the CVC's smoke control system, which is a critical component of the CVC's fire protection system and must work properly before the CVC can be opened to the public. This plan had not yet been submitted to or approved by the Fire Marshal Division. In addition, as we have previously noted, the Chief Fire Marshal's timely completion of the fire protection system's acceptance testing depends on his ability to obtain sufficient funding for a contractor to help perform the tests.

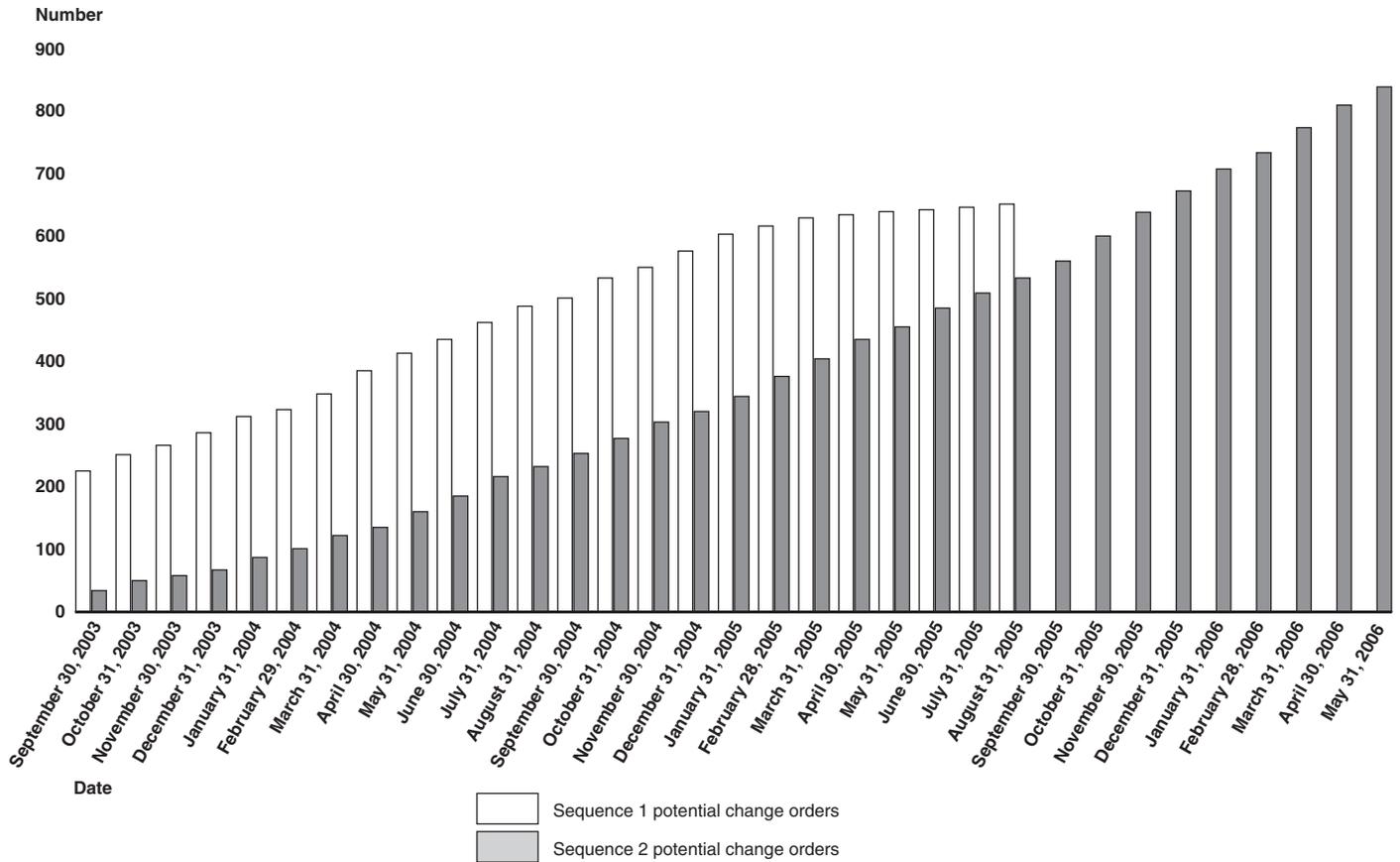
- *Building design and work scope continue to evolve.* The CVC has undergone a number of design and work scope changes. Since the Subcommittee's May 24 CVC hearing, AOC's architectural contractor has issued three design changes or clarifications. As of June 22, 2006, this contractor reported, another 14 were in process. In addition, since the project began, AOC has executed more than 80 sequence 2 contract

⁵According to the sequence 2 subcontractor that is fitting out the House and Senate expansion spaces, the delays in getting approved shop drawings for the fire protection system have already postponed ceiling close-ins in the expansion spaces, and AOC believes that further such delays, along with possible requests for design changes, pose the greatest risks to the completion schedule for the expansion spaces.

modifications for work that was not anticipated.⁶ Some of these changes, such as changes in the exhibit gallery and in the East Front, have resulted in delays. Furthermore, shop drawings for a number of project elements, such as certain components of the facility's fire protection system discussed above, and the design for the House and Senate gift shops have not yet been fully approved and are subject to change. Further design or scope changes in various project elements are also likely, given the project's experience to date. Project design and scope changes are typically reflected in the development of potential change orders (PCO), many of which result in contract modifications. Figure 5 shows the PCOs submitted for consideration for sequences 1 and 2 since September 2003. Although PCOs are not always approved, they are often regarded as a reasonably good indicator of likely future design or scope changes that can affect a project's cost and schedule. Even more important, the adverse impact of scope and design changes on a project schedule is likely to increase as the project moves toward completion. For example, changes in the design of the gift shops are likely to affect the project schedule more adversely now than if the changes had been made several months ago.

⁶These data exclude sequence 2 contract modifications for work that was planned but not included in the sequence 2 base contract. Examples include the fit-out of the House and Senate expansion spaces, the construction of the utility tunnel, and the purchase and installation of food service equipment.

Figure 5: Cumulative Number of Potential Change Orders Submitted for CVC Sequences 1 and 2 between September 2003 and April 2006



Source: AOC's construction management contractor.

As the figure indicates, new PCOs for sequence 1 were submitted until shortly before, and even for several months after, November 2004, when AOC determined that the sequence 1 contract work was substantially complete. Similarly, PCOs for sequence 2 are still being submitted, and we have seen no indication that their submission is likely to stop soon. It therefore appears likely to us that some of the design or scope changes indicated in PCOs could lead to contract modifications that will affect the project schedule. AOC agrees that it is important to minimize the impact of proposed design and scope changes.

Three additional issues associated with the CVC's new utility tunnel have resulted, or are likely to result, in additional work or slippages. First, AOC recently said that it plans to add an exit to the new CVC utility tunnel to enhance worker safety. However, the construction work to add this exit may not start until after the CVC is open, according to AOC. Second, AOC recently identified complications that are affecting work on the new CVC utility tunnel. Specifically, AOC found that potential asbestos and other safety-related problems in an older tunnel that intersects the new utility tunnel will have to be addressed before other work needed for the new utility tunnel's operation can proceed in the older tunnel. This additional safety-related work has contributed to the delay in the utility tunnel's completion discussed earlier in our testimony; had not been completed as of June 26; and could lead to additional delays in getting the utility tunnel operational. (AOC expects this work to be done by July 1, 2006.) Third, the delay in starting up the utility tunnel's operations has necessitated the use of temporary humidity control equipment for the orientation theaters to avoid damage to finish work and ceiling tile. In addition, further utility tunnel delays could require additional equipment in other areas, subject certain work to risk of damage, or delay finish or ceiling work in areas not suitable for the use of temporary humidity and temperature control equipment. For example, the CVC team installed ceiling tile in portions of the great hall to take advantage of the scaffolding in place, even though neither the temperature nor the humidity were controlled in that area. According to the CVC team, the installed tile could be damaged if the temperature or humidity is not within the specified levels.

- *Opening the CVC and expansion spaces at different times is likely to result in a temporary cap on CVC occupancy and could increase costs.* AOC's current plan to open the CVC in July 2007 before the expansion spaces are scheduled for completion is likely to result in a temporary cap on CVC visitor occupancy and may necessitate the construction of temporary emergency exits for fire and life safety protection.⁷ AOC is proposing this sequential approach because it believes that conducting acceptance testing for the fire protection system for the CVC and the expansion spaces concurrently would delay opening the CVC to the public. AOC's proposed July 2007 opening date for the CVC depends on the timely

⁷According to AOC, the CVC's occupancy at any one time would be temporarily limited to 3,500, compared with about 4,200, the normal anticipated occupancy level, until acceptance testing of the fire protection system for the expansion spaces has been completed. Although AOC anticipates the need for some temporary work, it does not believe that the associated costs will be substantial.

completion of work not only on the base project but also on the expansion spaces, since certain expansion space work must be completed before the CVC's opening. Because work on both the base project and the expansion spaces has been delayed during the last 3 months, we believe that it will be especially important to monitor the progress of construction to determine what additional work (and funding) may be needed to meet AOC's planned date for opening the CVC, including what temporary work may be required in the expansion spaces for the opening to occur before the expansion space work is completed.

- *Risks from insufficient stone deliveries remain, but may be diminishing.* According to AOC's construction management contractor, the sequence 2 contractor has, since the week of May 22, received four truckloads of interior wall stone from the wall stone fabricator. The sequence 2 subcontractor installing the interior wall stone recently asked its supplier to hold fabricated wall stone at its facility pending a request for delivery because of a shortage of storage space on the CVC site. As of June 16, the supplier had two truckloads on hold, according to AOC's construction management contractor. The sequence 2 contractor said that it does not foresee any further delays in the CVC work due to a lack of wall stone. Moreover, although none of the wall stone for the House and Senate expansion spaces was on site yet, the subcontractor responsible for this work is not anticipating delivery problems at this time. AOC's construction management contractor reported that no floor stone was installed in the exhibit gallery during the week of April 10 or between May 9 and May 17 because the installers ran out of floor stone for that area. According to AOC's construction management contractor, the remaining exhibit gallery floor stone has now been delivered, and the installation has been continuing. The CVC team does not expect delays in floor stone shipments to affect the pace of future floor stone installation.

Finally, as we have said in previous discussions with AOC, its construction management contractor, and the Subcommittee, it will be important for AOC to have adequate analysis and documentation of the reasons and responsibilities for delays.⁸ On April 11, 2006, AOC executed a contract modification authorizing its construction management contractor to have one of its managers who has not been involved in the CVC project assess the adequacy of this type of information. The manager submitted his report to AOC in early June. He reported generally positive findings but

⁸See for example: GAO, *Capitol Visitor Center: Effective Schedule Management and Updated Cost Information Are Important*, [GAO-05-811T](#) (Washington, D.C.: June 14, 2005).

also identified desired improvements. He made several recommendations to AOC, which AOC has generally agreed with and plans to implement consistent with the availability of resources. As we have previously stated, we believe it is important for AOC to complete its analysis of delays expeditiously given the current September 15, 2006, sequence 2 contract completion date and the impact this analysis is likely to have on delay-related costs.

Estimated Project Cost and Funding

As we testified during the Subcommittee's last three CVC hearings, we have estimated that the total cost to complete the entire CVC project would be about \$556 million without an allowance for risks and uncertainties and could be as much as about \$584 million with such an allowance. To date, about \$530 million has been provided for CVC construction. This amount includes about \$3.6 million that was made available for either CVC construction or operations and has been approved for CVC construction by the House and Senate Committees on Appropriations.⁹ To obtain the additional funding that it expected to need to complete the project's construction, AOC, in December 2005, requested \$20.6 million as part of its budget request for fiscal year 2007. This request was based, in part, on discussions with us and took into account our November 16, 2005, estimate of the cost to complete the project's construction without an allowance for risks and uncertainties and funding from existing appropriations. Our subsequent work—completed in preparation for the Subcommittee's February 15 and March 15 CVC hearings—indicated that AOC would need about \$5 million more, or about \$25.6 million in total additional CVC construction funds, to complete construction without an allowance for risks and uncertainties. This would bring AOC's total request for fiscal year 2007 CVC construction funds to \$25.6 million. In addition, AOC has indicated that it plans to use about

⁹Public Law 108-447, enacted on December 8, 2004, provided that up to \$10.6 million could be transferred from AOC's Capitol Building appropriation account for the use of the CVC project. The use of the amount transferred is subject to the approval of the House and Senate Committees on Appropriations. In June 2005, AOC received approval to use about \$2.8 million (including about \$1.6 million for CVC construction) of this \$10.6 million, leaving a balance of about \$7.7 million that could be used in the future after a rescission amounting to \$84,800. AOC recently received approval to use about an additional \$2 million of these funds for CVC construction, including, for example, the fabrication and installation of wayfinding signage and the fit-out of the gift shops, and about \$2.3 million for CVC operations. Thus, about \$3.4 million of the \$10.6 million remains available for approval for use for CVC construction or operations.

\$950,000 of the fiscal year 2007 general administration appropriations it has requested to provide contractual support for its Fire Marshal Division.

As we stated in our last three CVC testimonies, AOC believes that it may be able to reduce the amount of funds it will need in fiscal year 2007 to provide contractual support for testing the CVC's fire protection system and is exploring ways to do so. We plan to monitor this situation and report to the Subcommittee as soon as AOC has a firmer estimate. In addition, events occurring since the Subcommittee's May 24 CVC hearing have raised questions about the sufficiency of the \$556 million cost-to-complete estimate, given that it does not provide an allowance for risks and uncertainties. For example, AOC's extension of the project schedule by more than 2 months is likely to result in increased costs; AOC recently learned that a redesign of the gift shop fit-out did not reduce the cost estimate or bid price to the budgeted amount; and the cost estimates for wayfinding signage have exceeded the budgeted amount. Nevertheless, at this time, we have no specific indication that the total cost to complete the project will exceed our \$584 million estimate, which does include an allowance for risks and uncertainties. We plan to reassess our cost-to-complete estimate this summer and will keep the Subcommittee apprised of our results.

Mr. Chairman, this completes our prepared statement. We would be pleased to answer any questions that you or Members of the Subcommittee may have.

Contacts and Acknowledgments

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Appendix: Capitol Visitor Center Critical Construction Milestones, May 25, 2006-June 28, 2006

Activity	Location	Scheduled completion	Actual completion
Projection Screens	Orientation Theaters	5/30/06	4/22/06
Floor Stone	East Front Basement	5/30/06	
Ceiling Fabric	Congressional Auditorium	6/06/06	
Wall Stone Area 2	East Front Principal	6/06/06	
Wood Doors and Frames	Food Service	6/13/06	
Plaster Walls	Orientation Lobby	6/15/06	
Wall Stone Area 6	Congressional Auditorium	6/15/06	
Finish Paint	West Lobby Assembly	6/20/06	
Finish Paint	East Front Basement	6/20/06	
Wall Stone Area 2	Atria North Lower Level	6/20/06	6/20/06
Flooring	East Front Basement	6/23/06	
Stone Stairs	East Front Principal	6/27/06	
Ceiling Stone	East Front Principal	6/27/06	
Wall Stone Area 1	East Front Gallery	6/27/06	

Source: AOC's January 2006 CVC sequence 2 construction schedule for the scheduled completion dates and AOC and its construction management contractor for the actual completion dates as of June 26.

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